
Greenville County Technical Specification for:
SC-02 SEDIMENT TRAP

1.0 Sediment Trap

1.1 Description

A temporary Sediment Trap is formed by excavating a basin or by placing a compacted earthen embankment across a low area or stormwater conveyance channel. An outlet spillway/weir is constructed using Rip Rap and washed stone to slow the release of runoff. The Sediment Trap retains the runoff long enough to allow sediment to settle out before the runoff is discharged to a stabilized area. Design Sediment Traps to have a minimum 80% design removal efficiency goal of the total suspended solids (TSS) in the inflow.

1.2 Site Assessment

Select locations for Sediment Traps during a site evaluation, or by reviewing a detailed topographic map. Note natural watershed catchments and select Sediment Trap rap locations so that runoff land disturbing activities can easily be diverted into Sediment Traps. Ensure the drainage area to each Sediment Trap does not exceed five (5) acres.

Consider construction phasing when selecting locations for Sediment Traps. Select a location that allows the Sediment Trap to remain in service as long as possible. Select locations that are accessible for regular sediment removal and other necessary maintenance. Identify locations for sediment disposal as part of the Sediment Trap site selection. Identify sediment disposal locations on the Plans or as directed by the Engineer.

1.2 Design Requirements

1.2.1 General Design Requirements

Use temporary Sediment Traps for drainage areas with a maximum size of 5 acres. Do not install temporary Sediment Traps in Waters of State designated by a solid or dashed blue line on USGS 7.5 minute quadrangle maps). Utilize temporary Sediment Traps until the contributing flow areas to the trap have undergone final stabilization.

The design requirements outlined in this Specification must ensure a minimum of 80% trapping efficiency of total suspended solids (TSS) for the 10-yr 24-hour storm event. Ensure temporary Sediment Traps adhere to the following requirements:

- Drainage Area: 5acre maximum.
- Maximum Design Life: 18 months
- Minimum 80%design removal efficiency for TSS.
- Sediment storage volume accounted for in the overall design volume of the Sediment Trap.
- Do not incorporate inside Sediment Trap slopes steeper than 3H:1V where applicable.
- Basin Shape: Optimum Basin length to width ratio is 2L:1W.
- Baffles installed in the Sediment Trap.
- At least one row of Baffles placed between the outlet structure and all pipes or channels discharging into the Sediment Trap.
- Embankment Requirements:

- Maximum dam height: 5-feet.
 - Minimum top of dam width (parallel to flow): 2-feet.
 - Maximum rock weir spillway height: 3.5-feet.
 - Minimum rock bottom width (perpendicular to flow): 3-feet.
 - Rock weir structure body made of 12-inch D_{50} Class III Riprap or equivalent.
 - Rock Wire structure upstream face with 1-foot thick layer of D_{50} 1-inch stone (#57 or Aggregate No. 5) or equivalent.
 - Maximum side slopes of rock weir structure: 2H:1V.
 - Place a non-woven geotextile filter fabric before installing the rock weir structure.
 - Size the rock weir spillway to safely pass the peak discharge of the 10-year 24-hour storm event with a maximum flow depth of 6 inches and a minimum freeboard of 1 foot.
1. Determine the required sediment storage volume using the Universal Soil Loss Equation or other sediment modeling programs.
 2. Determine the bottom and top surface area of the sediment storage volume using 3H:1V side slopes from the bottom of the Sediment Trap.
 3. Determine the total Sediment Trap dimensions by adding the depth required for the 10-year, 24-hour design storm above the surface of the sediment storage volume, while not exceeding 3H:1V side slopes.
 4. Show the the sediment cleanout level (50% sediment storage volume) on the Plans.
 5. The Design Aids located in Section 8.7.5 of Chapter 8 of the Design Manual may be used to properly size the Sediment Trap for 80% TSS removal efficiency. Sedimot, SEDCAD, Pond Pack and other computer models may also be utilized to design Sediment Traps for 80% TSS removal efficiency.

1.2.2 Specific Design Requirements

Baffles – Use three rows of Baffles across the entire width of the Sediment Trap that divide the Sediment Trap into 4 chambers. Sediment Traps with lengths less than 20 feet in length use two (2) baffles that divide the Sediment Trap into 3 chambers. Place Porous Baffles as specified in the *Porous Baffle Specification*.

Ensure at least one row of Baffles placed between the outlet structure and all pipes or channels discharging into the Sediment Trap.

If applicable in the modeling program, the designer may reduce the dead space to 0% to model porous baffles.

Outlet Protection - Provide outlet protection to prevent re-suspension of sediment particles by using riprap, TRM, Transition Mat, or similar erosion prevention BMP. Ensure outlet velocities do not exceed the capability of the BMP selected.

1.3 Installation Requirements

1.3.1 Sediment Trap Installation Requirements

Sediment Traps are constructed by excavating a depression in the ground or creating an impoundment with a small embankment. Minimize the disturbed area from installation by selecting Sediment Trap locations at natural depressions or small swales. The following steps are required during installation:

1. Clear, grub, and strip the area under the embankment of all vegetation and root mat. Remove all surface soil containing high amounts of organic matter, and stockpile or dispose of it properly. Remove all unused fill material to the designated disposal area.
2. Grade the Sediment Trap to a minimum 0.5% slope towards the rock weir spillway.
3. Ensure that fill material for the embankment is free of roots, woody vegetation, organic matter, and other objectionable material. Place the fill in lifts not to exceed 9 inches, and machine compact. Over fill the embankment 6 inches to allow for settlement.
4. Discharge stormwater runoff into the basin in a manner to prevent erosion. Use temporary slope drains or diversions with outlet protection to divert sediment-laden water to the upper end of the pool area to improve trapping efficiency.
5. Install 3 rows of Baffles a maximum of 3.5-feet in height with a spacing of $\frac{1}{4}$ the Sediment Trap length for Sediment Traps greater than 25 feet in length. Install 2 rows of Baffles with a spacing of $\frac{1}{3}$ the Sediment Trap length for Sediment Trap less than 25 feet in length.
6. Ensure that at least one row of Baffles is placed between the rock weir spillway structure and all pipes or channels discharging to the Basin.
7. Baffles may consist of Porous Baffles, or Riprap Baffles.
8. Install Riprap Baffles a maximum of 3.5-feet in height consisting of Class A or B Riprap. Do not place washed stone on the face of the Riprap Baffles.
9. Mark the sediment cleanout level (50% sediment storage volume) of the Sediment Trap with a stake in the field.
10. Stabilize the embankment and all disturbed areas with temporary stabilization measures above the sediment pool and downstream from the Sediment Trap immediately after construction.

1.3.2 Spillway Installation Requirements

Clear loose soil and debris from the area where the rock weir will be placed. Install a non-woven filter fabric on the foundation, including the embankments, prior to backfilling with rock. Install the rock to extend downstream past the toe of the embankment.

Construct the rock weir spillway using 12-inch D₅₀ Class III Riprap or equivalent. Cover the upstream face of the rock weir with a 1-foot thick layer of D₅₀ 1-inch stone (#57 or Aggregate No. 5) or equivalent.

Place rock and stone by hand or mechanical devices. Make certain the rock weir spillway is stable and hand place additional rock material for stability if needed. Ensure a minimum 1.5 feet of freeboard is provided above the weir spillway crest to prevent scour and erosion.

1.5 Maintenance

The key to a functional Sediment Trap is continual monitoring, regular maintenance and regular sediment removal. Attention to sediment accumulations within the Sediment Trap is extremely important. Continually monitor sediment deposition in the Sediment Trap.

Inspect temporary Sediment Traps a minimum of once every 7 days and inspections are recommended within 24-hours after each rainfall event that produces $\frac{1}{2}$ -inches or more of precipitation until final stabilization is achieved.

Remove sediment, and restore the trap to its original dimensions when the sediment has accumulated to 50% the design depth of the trap.

Place removed sediment in the designated disposal area, and replace the part of the gravel facing that is impaired by sediment. Remove and replace rock weir spillway if the Sediment Trap fails to drain.

Check the structure for damage from erosion or piping.

Periodically check the depth of the spillway to ensure it is a minimum of 1.5 feet below the low point of the embankment. Immediately fill any settlement of the embankment to slightly above design grade. Replace any riprap displaced from the spillway immediately.

Remove sediment deposits trapped by the porous baffle fencing when it reaches $\frac{1}{2}$ the fence height to provide adequate storage volume for the next rain and to reduce pressure on the baffles. Should the fabric of a baffle collapse, tear, decompose, or become ineffective, replace it promptly. Take care to avoid damaging the baffles during cleanout.

Remove temporary Sediment Traps when the watershed is completely stabilized. Remove temporary Sediment Traps within 30 days after final site stabilization is achieved or after it is no longer needed. Permanently stabilize areas disturbed as a result of temporary Sediment Traps removal.

1.6 References

Dane County. Erosion Control and Stormwater Management Manual. 01/02/07.

NCDOT Stormwater Practice Standards and Specifications. Chapter 6 Section 6.60.1 June 2006.